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TOXICS USE REDUCTION ACT

Techniques and Technologies for the Future

In July 1989, the Massachusetts legislature unanimously passed the Toxics Use Reduction Act (TURA). The Act, a consensus law developed in cooperation with business and environmental groups, was one of the first and is the most ambitious state pollution prevention law in the nation. TURA sets the ambitious goal of a statewide 50 percent reduction in toxic waste generation by 1997 (based on 1987) - to be achieved by using less hazardous materials to reduce or eliminate pollution at the source. Many businesses must file annual reports on the toxic chemicals they use and prepare plans to reduce that use. TURA also established the Office of Technical Assistance for Toxics Use Reduction (OTA) and the Toxics Use Reduction Institute (TURI) to help business achieve those goals. The law establishes an Administrative Council of state officers to oversee implementation of the law and an Advisory Board to represent the public, to provide a forum for public and expert guidance, and to establish a TUR award program. The legislation comes at a crucial time: there is rapidly diminishing capacity to dispose of waste, and public awareness of the hazards of toxics and resistance towards construction of hazardous waste treatment and disposal facilities are high.

How is TURA different from other environmental laws?

The Toxics Use Reduction Act (MGL, Ch. 21D) addresses the issue of toxics waste generation by promoting toxics use reduction (TUR). This can be achieved through process modification, input material substitutions, improved operation and maintenance, product reformulation and internal recycling to avoid waste generation. The Act focuses on **reducing or eliminating** the use of toxic substances and the generation of toxic byproducts in the production process itself. For the specified industries and chemicals, this approach minimizes costly end-of-pipe waste treatment by focusing on use and waste reduction planning.

Who is covered under TURA?

Firms that:

- 1) use more than the specified threshold of a listed chemical,
- 2) fall within the Standard Industrial Classification (SIC) codes specified in the Act, and
- 3) employ the equivalent of 10 or more full time employees are subject to TUR planning and reporting requirements.

The specific industries covered under the Act are SIC codes: 10-14 (mining); 20-39 (manufacturing); 40, 44-49 (transportation, communications, gas, electric and sanitary services); 50, 51 (wholesale trade), and 72, 73, 75, 76 (certain services).

What chemicals are regulated under TURA?

All chemicals listed in the Superfund Amendment and Reauthorization Act (SARA) Title III are covered, as well as, since the beginning of 1994, the additional chemicals listed in

the Comprehensive Environmental Response and Compensation Liability Act (CERCLA).

Additional chemicals, at the rate of no more than 10 per year, may be added to the list at the discretion of the TUR Council or the Department of Environmental Protection (DEP). Users may petition to have chemicals removed from the list.

Chemical Use Thresholds

TURA divides toxics users into two categories, Large Quantity Users (LQU), and Small Quantity Users (SQU).

LQUs are those which annually manufacture or process at least 25,000 pounds of a listed substance, or otherwise use at least 10,000 pounds of the material.

SQUs are all other toxics users not exceeding the above thresholds. Unless DEP has elected to require planning and reporting by a company found in violation of environmental standards, SQU's are not otherwise subject to the Act's requirements.

Toxics Fee Structure

TURA provides funding for implementation through a scaled fee structure.

The 700-plus LQUs filing under the Act pay a "Toxics Use Fee" based upon the number of employees at the facility plus \$1100 per chemical reported over the threshold amount.

Full Time Employees	Base Fee	Chemical Fee	Maximum Fee
10-49	\$1,850	\$1,100	\$5,500
50-99	\$2,775	\$1,100	\$7,400
100-499	\$4,625	\$1,100	\$14,800
500 or more	\$9,250	\$1,100	\$31,450

Annual Reporting

The Act requires an LQU to submit an annual report, which becomes public record, to DEP that includes SARA 313 Form R and TURA Form S, which uses the Form R as a base and includes additional data for each substance, broken down by production units. Reporting involves:

- Establishing a "reporting base year" to measure future reduction gains against. This is either (1) the first calendar year that the user filed under SARA Title III, or (2) the first year that toxic chemical use can be documented at the production unit, whichever occurred first, but not before 1987.
- Computing both the "Byproduct Reduction Index" (BRI) and the "Emissions Reduction Index" (ERI) for each production unit to document byproduct and emissions changes since the base year.

"Byproduct" is "all nonproduct outputs of toxic or hazardous substances generated by a production unit, prior to handling,

transfer, treatment, or release.”

“Emission” is “a release of a toxic or hazardous substance to the environment or a transfer of a toxic or hazardous substance in waste to an off-site location.”

When a byproduct leaves a production unit it becomes an emission; byproducts which are retained in the production unit (i.e. through internal recycling, etc.) are not emissions. The BRI measures reductions in byproduct magnitudes per unit of product against a base year; the ERI does the same for emissions.

BY PRODUCT REDUCTION INDEX (BRI)

$$BRI = 100[(A - B) / A]$$

	Base Year		Current Year
	Byproducts Generated		Byproducts Generated
A =	_____	B =	_____
	Unit of Product		Unit of Product

EMISSIONS REDUCTION INDEX (ERI)

$$ERI = 100[(A - B) / A]$$

	Base Year		Current Year
	Emissions Generated		Emissions Generated
A =	_____	B =	_____
	Unit of Product		Unit of Product

• Reporting the method(s) employed to reduce byproducts from a production unit must be indicated by filling out a **Toxics Use Reduction Methods Matrix**.

MATRIX FORM FOR PRODUCTION UNIT

	Input Substitution	Product Reformulation	Production Unit Redesign	Production Unit Modernization	Improved Operation & Maintenance	Byproduct as Product	Miscellaneous
Materials Handling/storage							
Processing Operations							
Finished Goods Handling							

Performance Standards

Beginning in 1995, the state may designate up to three segments of industry per year, as **priority user segments** for achieving use reduction goals based upon toxics use and economic feasibility. Such performance standards will be established when a majority of the businesses in a user segment fall significantly below that segment's regional, national, or international toxics use reduction achievements. The number of priority user segments may not exceed 15 at

any one time and the designation has a five-year limit.

Performance Standards will be set based upon the industry segment's average byproduct reduction index. Those companies falling below the norm will be required to perform additional use reduction to meet the segment's current average. Performance Standards may be extended to SQU's in priority user segments in the year following the designation.

Toxic Use Reduction Plans

The core of TURA is the development, by industry, of a TUR plan by each covered facility.

LQUs must declare two and five year goals for toxics reduction and develop plans to meet those goals. In August 1993, DEP, OTA and TURI began a series of orientation seminars and workshops for the companies required to prepare TUR plans by the July 1994 deadline. All employees of affected companies had to be informed of the plan requirement and July deadline by January 1, 1994. The planning requirement is a “self help” provision - implementation is not required, but companies that do not meet their goals can be required to explain why. The intended effect of the law is that through the process of preparing a plan, firms will identify more efficient production methods that prevent pollution and save money.

The TUR plan must cover:

- Current and projected toxics use;
- Economic impact of each chemical used;
- Appropriate technologies for meeting reduction goals;
- All training, technologies and procedures to be implemented; and anticipated cost savings, and
- An implementation schedule for the planned program.

Goals. The plan must include two- and five-year goals for each substance expressed in terms of the byproduct reduction index.

Certification. The plan must be certified by a Toxics Use Reduction Planner. TURPs will be grandfathered or earn their licenses through programs run by DEP and TURI.

Public Disclosure & Trade Secrets

Companies are required to submit Summaries only of their plans to DEP. The actual plans, along with supporting documentation, must be retained at the company and be available for DEP review.

All Form S reports and summaries of Toxic Use Reduction plans are considered public information. Citizens may petition DEP to check the full plans of any facility and report back to the petitioners. The full plans are *not* public documents.

Trade secrets are protected under the Act provided all secrets are claimed at the time of initial submission of the plan.

The TURA Advisory Board and Administrative Council

The Act calls for two boards to provide expertise and executive administration of TURA. The Secretary of the Executive Office of Environmental Affairs chairs the

Administrative Council on Toxics Use Reduction, which includes the secretaries, commissioners, or directors or their designees of relevant state departments and agencies. The Massachusetts Advisory Board on Toxics Use Reduction includes representatives from the Attorney General's Office and the Massachusetts Water Resources Authority and 13 additional members appointed by the governor as representatives of six specific areas of the general public.

The State Agencies

OTA Under the Act, the **Office of Technical Assistance for Toxics Use Reduction** has been formed to provide large and small industries with a confidential nonregulatory resource to assist in their reduction planning. OTA offers the following free services to Massachusetts businesses:

- On-site technical evaluation of TUR opportunities.
- Economic analyses to identify relative costs and benefits.
- Sponsorship and participation in conferences, workshops, trade fairs to disseminate information on TUR.
- Train other state and local agency personnel to recognize TUR opportunities.
- Response to requests for information.

DEP Under the Act, the **Department of Environmental Protection** mandate is to continue environmental inspections and compliance action as well as to perform several additional duties:

- Formulate the criteria for TUR plans.
- Review and approve TUR reports, plans and summaries.
- Recommend "priority user segments" to the Administrative Council.
- Streamline reporting requirements relating to TUR.
- Integrate TUR ideas into facility inspections.

TURI The Act established a **Toxics Use Reduction Institute** to focus on reduction of toxic chemical use in industry and the community. The Institute, based at the University of Massachusetts Lowell, includes the Technology Transfer Center, Center for Environmentally Appropriate Materials, and Surface Cleaning Laboratory, and is responsible for:

- Curriculum development and training of TUR planners.
- Sponsoring research in new technologies that reduce toxics use.
- Development of public policy to decrease risk to the environment and public health.
- Providing technical support and scientific advice to government to advance pollution prevention programs.

Glossary of Acronyms and Toxics Use Reduction Terms

Toxics Use Reduction "In-plant changes in production processes or raw materials that reduce, avoid or eliminate the use of toxic or hazardous substances or generation of hazardous byproducts per unit of product, so as to reduce risks to the health of workers, consumers, or the environment, without

shifting risks between workers, consumers, or parts of the environment."

Toxics use reduction is achieved through input substitution, process redesign, product redesign, process modernization, improved operation and maintenance, and in-process recycling. Terms such as pollution prevention, waste reduction, and source reduction are toxics use reduction synonyms.

Byproduct	All nonproduct outputs of toxic or hazardous substances generated by a production unit, prior to handling, transfer, treatment or release."
Emission	A release of toxic or hazardous substance to the environment or a transfer of toxic or hazardous substance in waste to an off-site location."
Production Unit	A process, line, method, activity or technique, or a combination or series thereof, used to produce a product."
Unit of Product	A production measure used under TURA to normalize byproduct measures for year-to-year changes in production levels.
BRI	Byproduct Reduction Index
CERCLA	Comprehensive Environmental Response and Compensation Liability Act
CMR	Code of Massachusetts Regulations
DEP	Department of Environmental Protection
ERI	Emission Reduction Index
LQU	Large Quantity User
MGL	Massachusetts General Laws
OTA	Office of Technical Assistance for Toxics Use Reduction
ppm	parts per million
SARA	Superfund Amendment and Reauthorization Act
SIC	Standard Industrial Classification
SQU	Small Quantity User
TCA	1,1,1 trichloroethane
TUR	Toxics Use Reduction
TURA	Toxics Use Reduction Act: MGL, Ch. 21T; Implementation reg's: 310 CMR 50.00 - 50.49
TURI	Toxics Use Reduction Institute
TURP	Toxics Use Reduction Planner: 310 CMR 50.50 - 50.61)

Resources and Publications

OTA and TURI both maintain resource libraries and publish manuals, fact sheets, case studies and reports. OTA has published a technical assistance manual: "A Practical Guide to Toxics Use Reduction." TURI publishes the free quarterly newsletter, "TURA Reports."

TURA Timeline

7-1-90 LQUs begin filing Form R with DEP and begin paying annual TUR Fee.

- 7-1-91 LQUs in SIC codes 20 - 39 must file annual toxics use report Form S.
- 7-1-92 All LQUs including those in the remaining covered SIC codes file reports for 1991. First third of CERCLA chemicals included in report.
- 7-1-93 1992 reports due, second third of CERCLA list also must be reported.
- 1-1-94 TURA filers notify employees of TUR plan requirement and deadline.
- 7-1-94 LQUs must complete TUR plans and file plan summary with DEP. 1993 reports due, all CERCLA chemicals are now reportable.
- 7-1-95 DEP may begin to designate priority user segments, performance standards and add up to 10 chemicals.
- 7-1-96 First TUR plan update due, and two years thereafter.

TUR CASE STUDY: Process Modification

The Lowell Corporation of Worcester, Massachusetts, a ratchet manufacturer, uses zinc phosphate to improve the corrosion resistance of their products. Lowell's passivating process discharged zinc wastewaters at concentrations exceeding their permit limits. If the process was shut down, Lowell would have to send the parts out to be phosphated. Following the sewer authority's recommendation, Lowell invited OTA to visit the facility to explore use reduction options. OTA proposed the addition of a dead rinse tank after the phosphate tank to decrease zinc drag-out. Past experience had shown that a single drag-out tank can reduce drag-out by 50%. The tank took 10 minutes to install. Zinc discharge dropped from 4.77 ppm to 1.55 ppm, below the 2.61 ppm discharge limit. Lowell estimates the savings from not having to contract out the phosphating process to a vendor at roughly \$26,000 annually.

TUR CASE STUDY: Chemical Substitution

Erving Paper Mills uses waste paper to manufacture paper absorbent products and printed napkins. Company concern over health risks to its employees motivated a search for a substitute 1,1,1 trichloroethane (TCA) used to clean printing plates. TCA is a suspected carcinogen and contributes to destruction of the ozone layer. About 270 hours, mostly by the press operators, themselves, were devoted to evaluating several products over a three month period. A new aqueous cleaner was selected that is a straight substitution for TCA and required no retraining or equipment purchases. Erving eliminated TCA emissions and use by 400,445 lbs yearly and disposal of several barrels of hazardous waste, while saving approximately \$400,000 annually over the cost of TCA in 1990, the last year the chemical was used.

TUR CASE STUDY: New Chemicals and Process Modification

Customer pressure, employee concern and the new Federal labeling requirements for Class I ozone depleting chemicals combined to motivate Hardigg Industries to eliminate 1,1,1 trichloroethane (TCA) from its plastic container molding operations. To facilitate removal of the containers, a TCA-

based release was wiped onto the molds prior to addition of the plastic pellets. Elsewhere, a dip tank cleaning operation used TCA to remove cutting oils and metal fines from machined metal hinges and locks. In a third area, following assembly of the metal parts and plastic containers, grease and oils were removed by wiping the products with a TCA-based cleaner. After six months of testing and experimentation Hardigg was able to replace TCA with water soluble cleaners except for one production line where less than 100 pounds a year of TCA is still consumed. A non-hazardous compound was substituted for a TCA-based mold release. Hardigg's previous annual average emissions of 11,082 pounds of TCA have now been more than 99.1 percent eliminated. Hardigg installed new tanks for the dip cleaning operation at a cost of \$2,000. The new mold release agent has not added to production costs beyond the labor and materials expended the during testing period. Hardigg's labor costs have risen because the new cleaner does not evaporate as quickly as TCA and workers spend more time removing residual cleaner. However, by meeting the demand for non-ozone depleting chemicals, Hardigg satisfied its customers and retained their business. While the new chemicals cost less than half of the most recent price Hardigg paid for the TCA-containing products, overall production costs at present are slightly higher because of the additional labor costs. Use of these alternatives has reduced Hardigg's environmental reporting and compliance requirements and their associated costs.

TUR CASE STUDIES: Introducing New Equipment

To paint 1,000 cars a year, the MAACO franchise in Lawrence, Massachusetts, until recently used 1,000 gallons of paint. OTA helped motivate implementation of HVLP (high volume, low pressure) spray guns and the net result is more paint on cars and less in the booth — an overall 25 percent reduction in paint use. Introduction of the new spray equipment was not a major investment, and the new spray guns are designed to make cleaning easier and more efficient (thus requiring substantially less clean-up solvent). It took the company's skilled operators about a month to become fully comfortable with the new equipment.

A maker of heat-shrink plastic tubing came to OTA for help in removing a heat transfer liquid from the rinse water used to wash the coolant from the tubing. OTA recommended that the company use an air knife to blow the coolant off the tubing. In the process of investigating procedures that would simply avoid the washing step, the company found — and has now implemented — an even better option: vacuum removal which recovers the antifreeze so that it can be recycled back into the process.

For Further Assistance call or write:

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